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FIG. 1

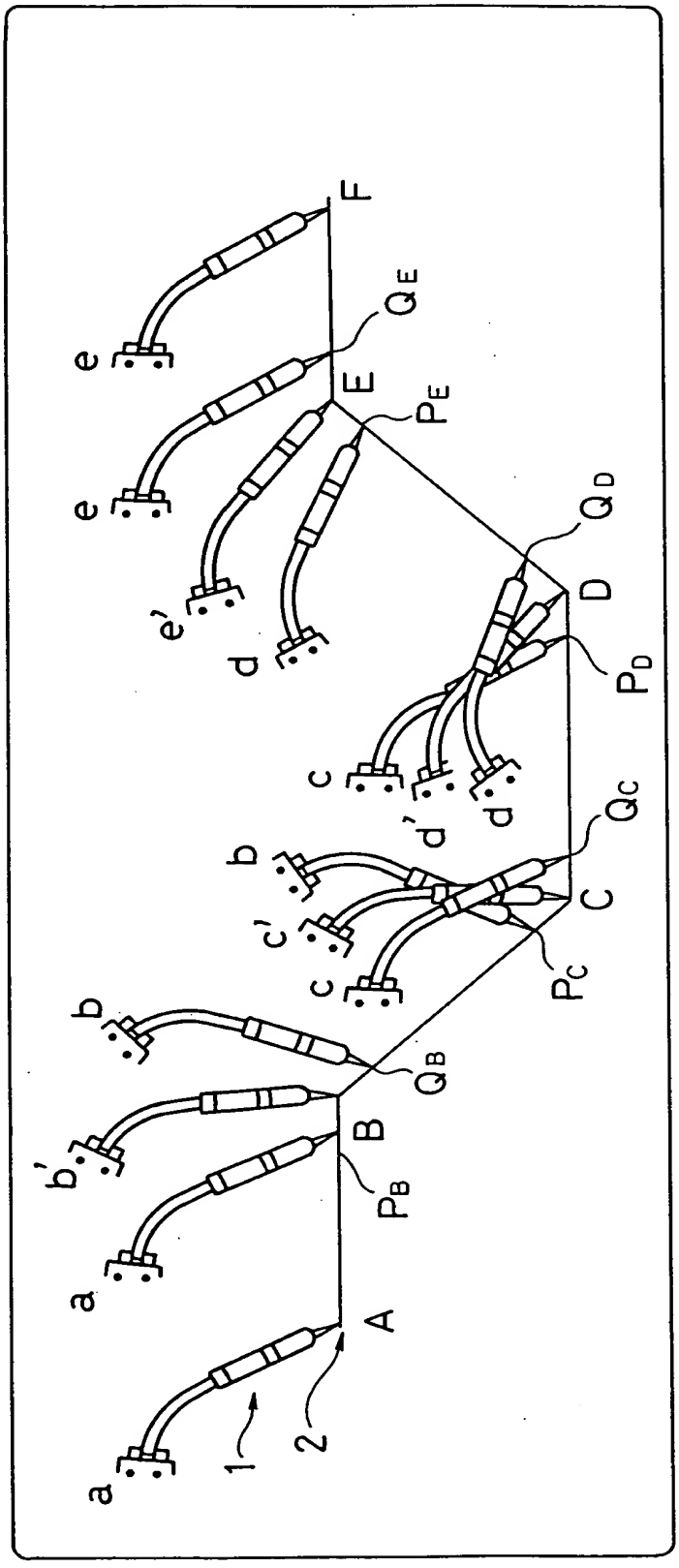

FIG. 2A

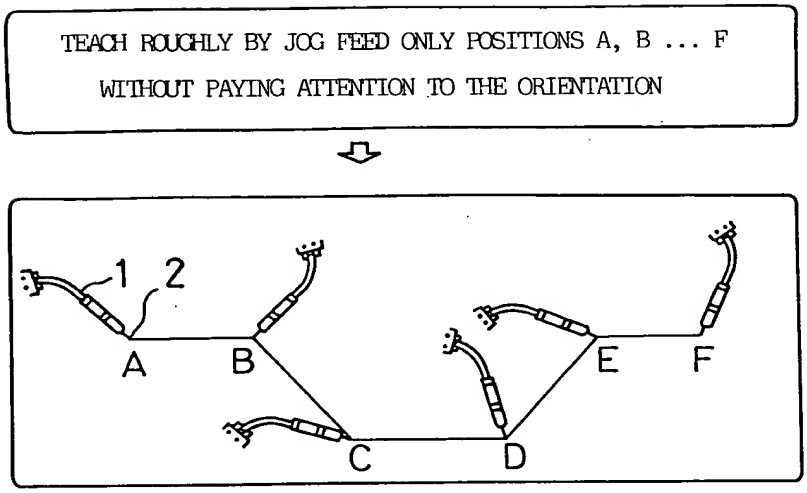

FIG. 2B

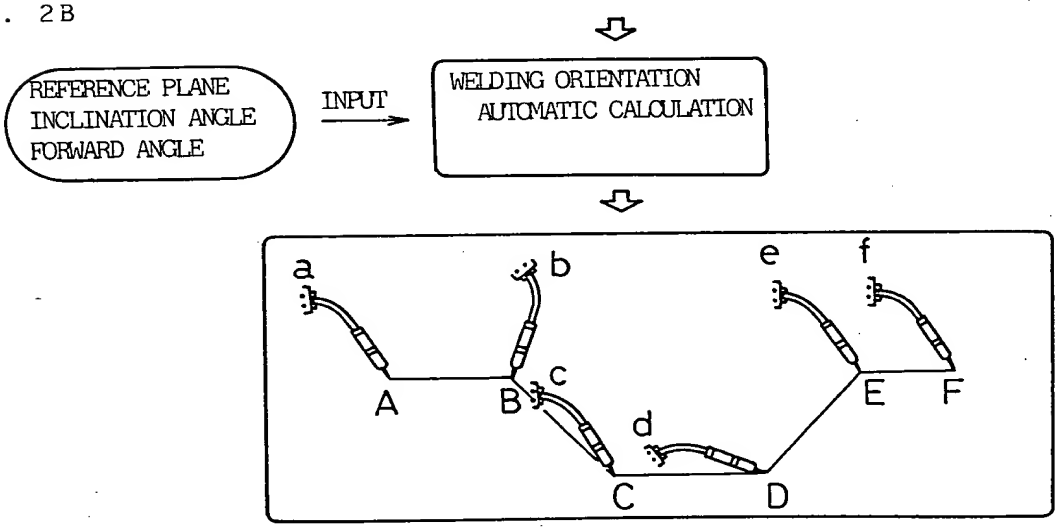

FIG. 2C

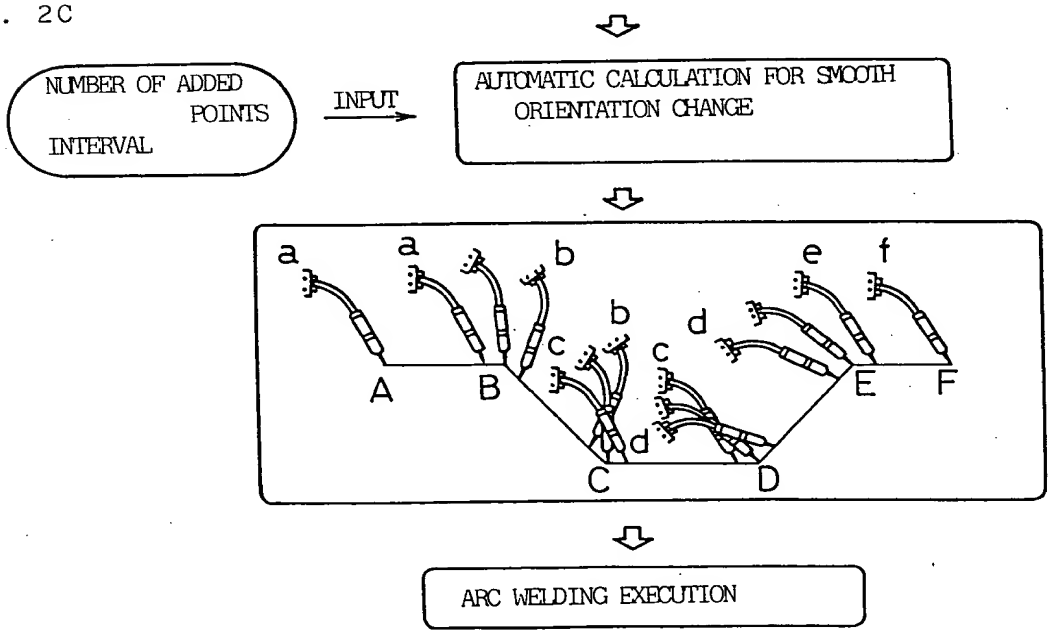

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FIG. 3

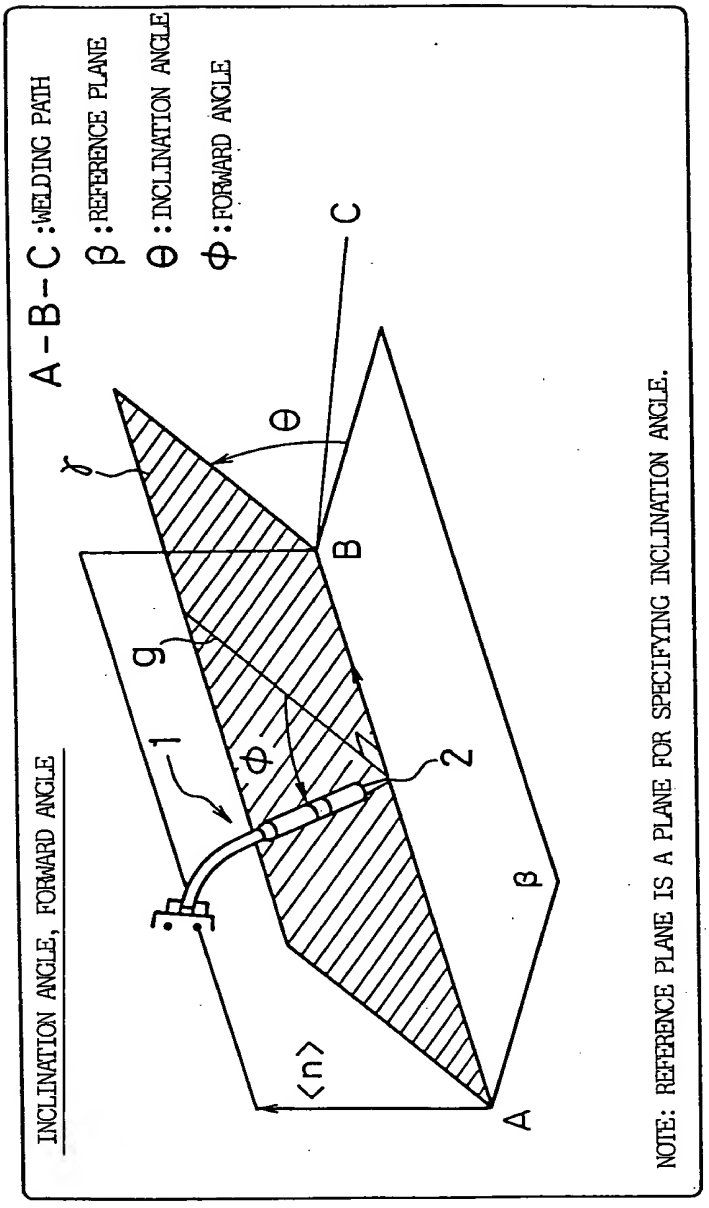

FIG. 4

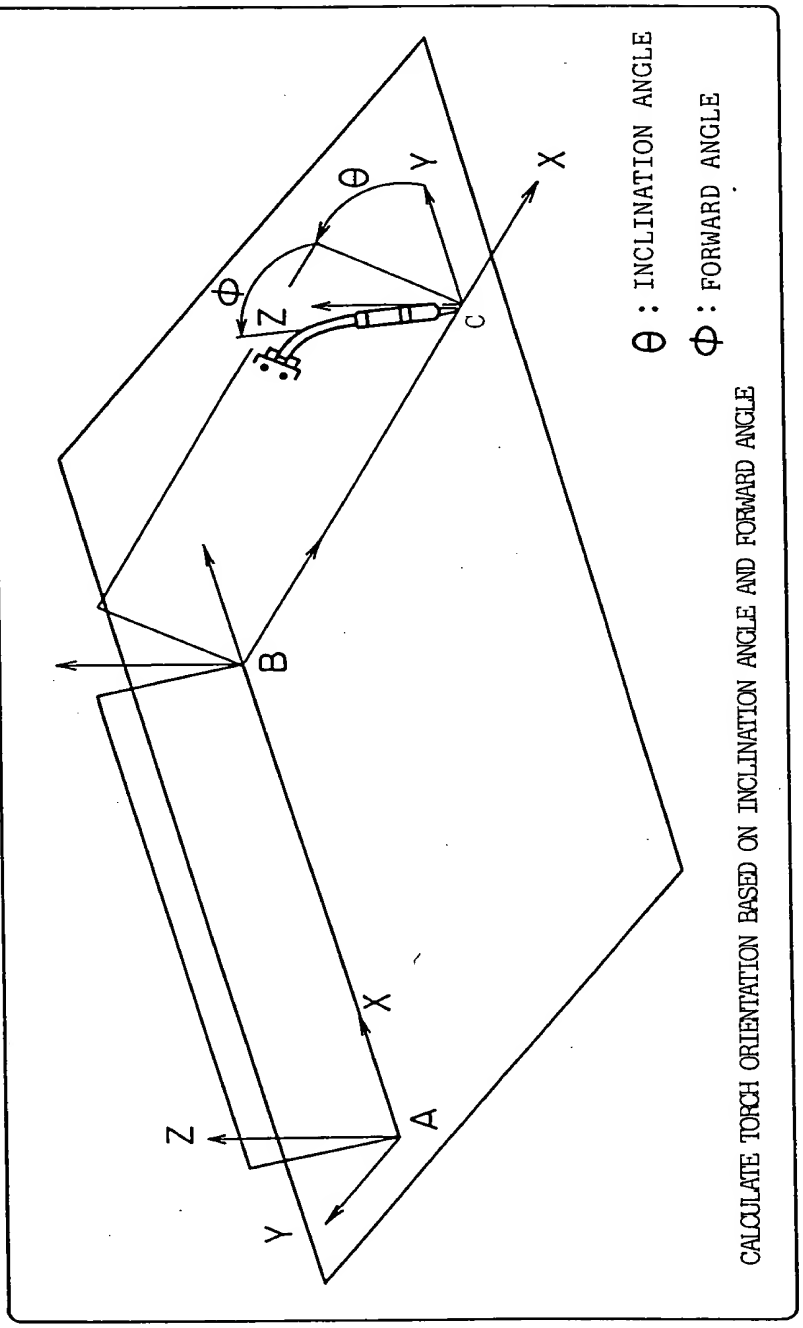
Θ : INCLINATION ANGLE
Φ : FORWARD ANGLE
CALCULATE TORCH ORIENTATION BASED ON INCLINATION ANGLE AND FORWARD ANGLE
A
B
C
X
Y
Z
Θ
Φ

FIG. 5

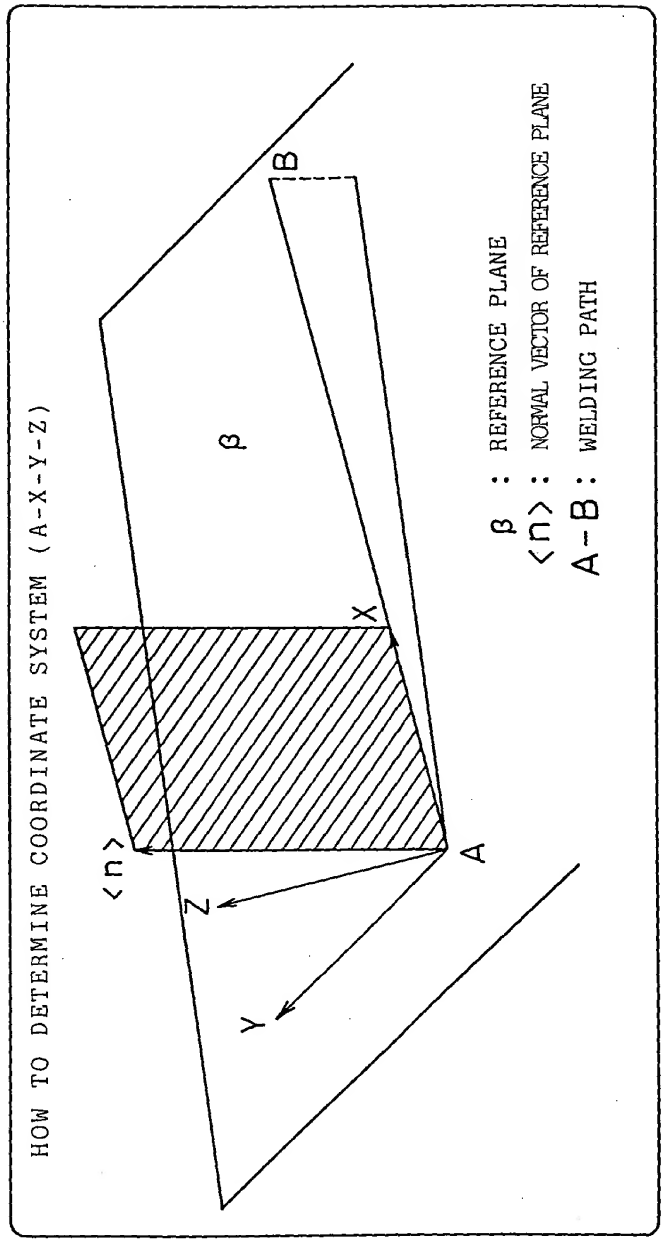
HOW TO DETERMINE COORDINATE SYSTEM (A-X-Y-Z)
β : REFERENCE PLANE
<n> : NORMAL VECTOR OF REFERENCE PLANE
A-B : WELDING PATH
β
B
X
A
<n>
Z
Y

FIG. 6

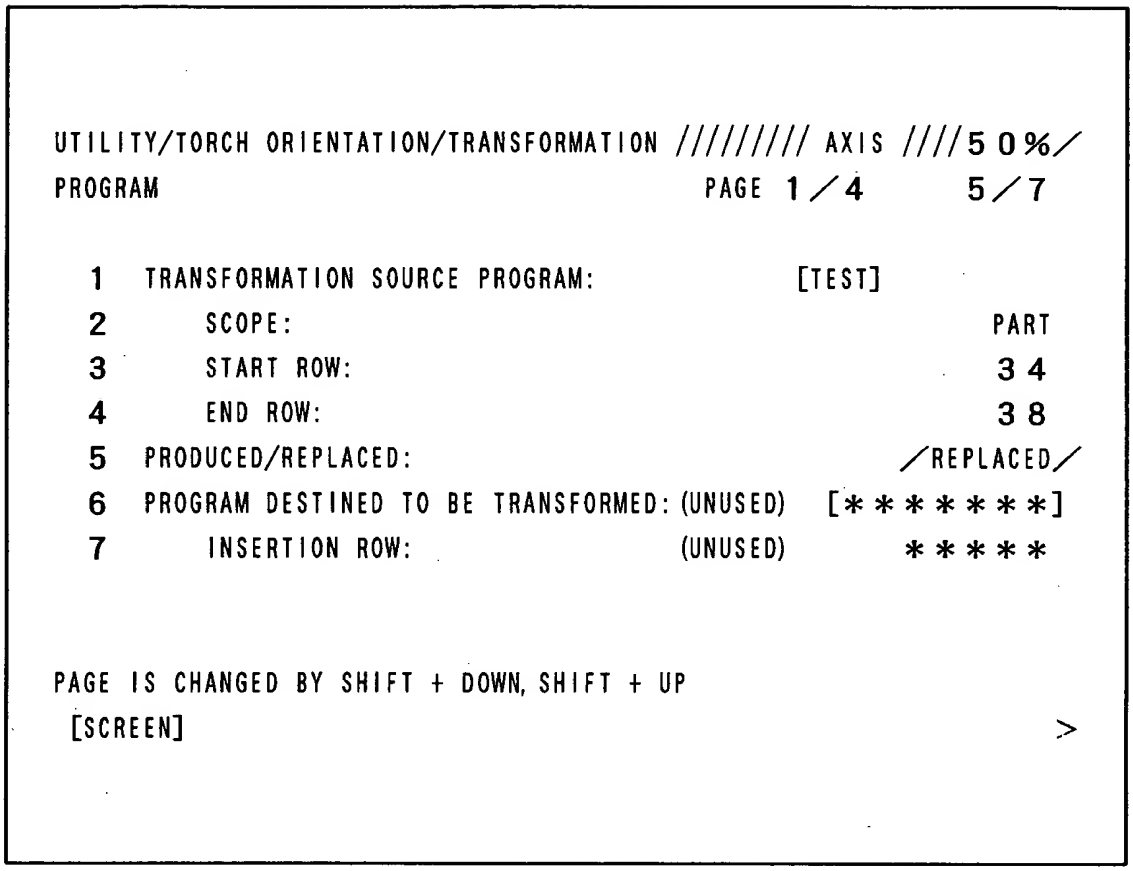
UTILITY/TORCH ORIENTATION/TRANSFORMATION //////// AXIS ////50%/
PROGRAM PAGE 1/4 5/7
1 TRANSFORMATION SOURCE PROGRAM: [TEST]
2 SCOPE: PART
3 START ROW: 34
4 END ROW: 38
5 PRODUCED/REPLACED: /REPLACED/
6 PROGRAM DESTINED TO BE TRANSFORMED: (UNUSED) [*******]
7 INSERTION ROW: (UNUSED) *****
PAGE IS CHANGED BY SHIFT + DOWN, SHIFT + UP
[SCREEN] >

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FIG. 7

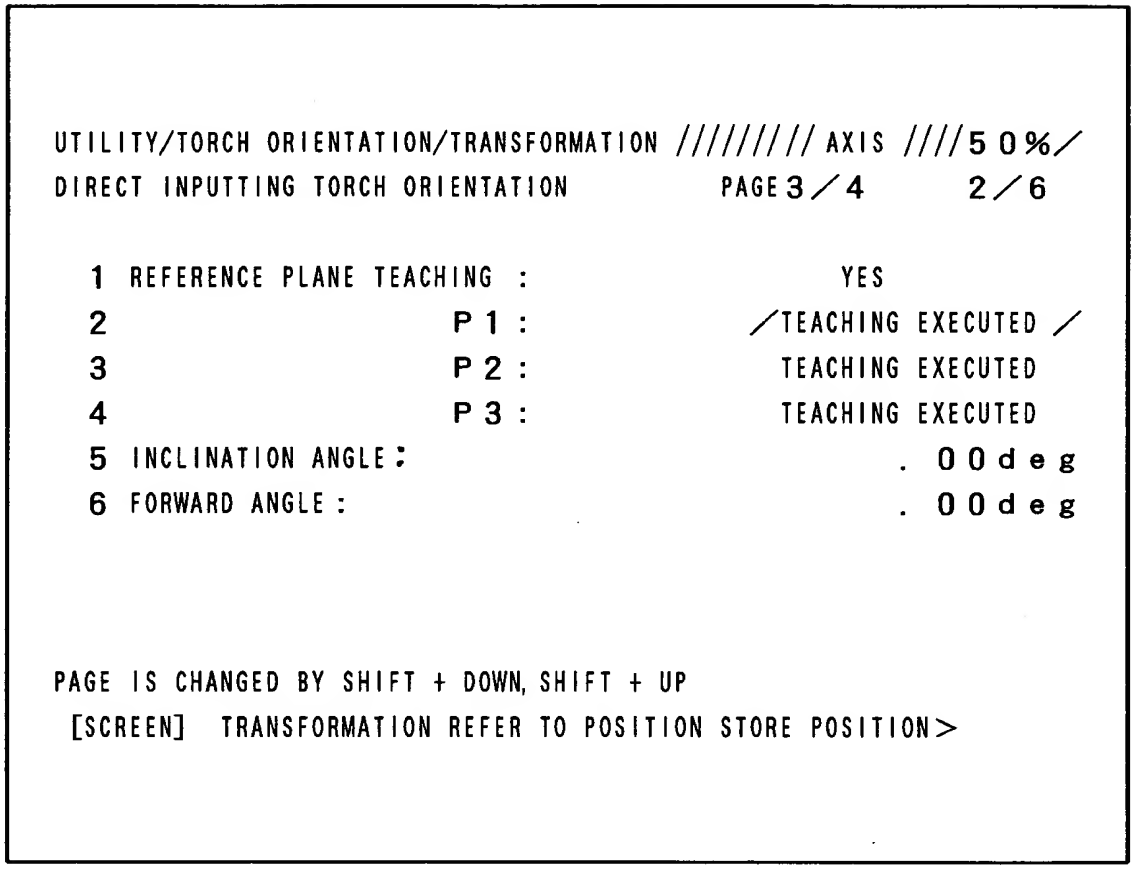


FIG. 8

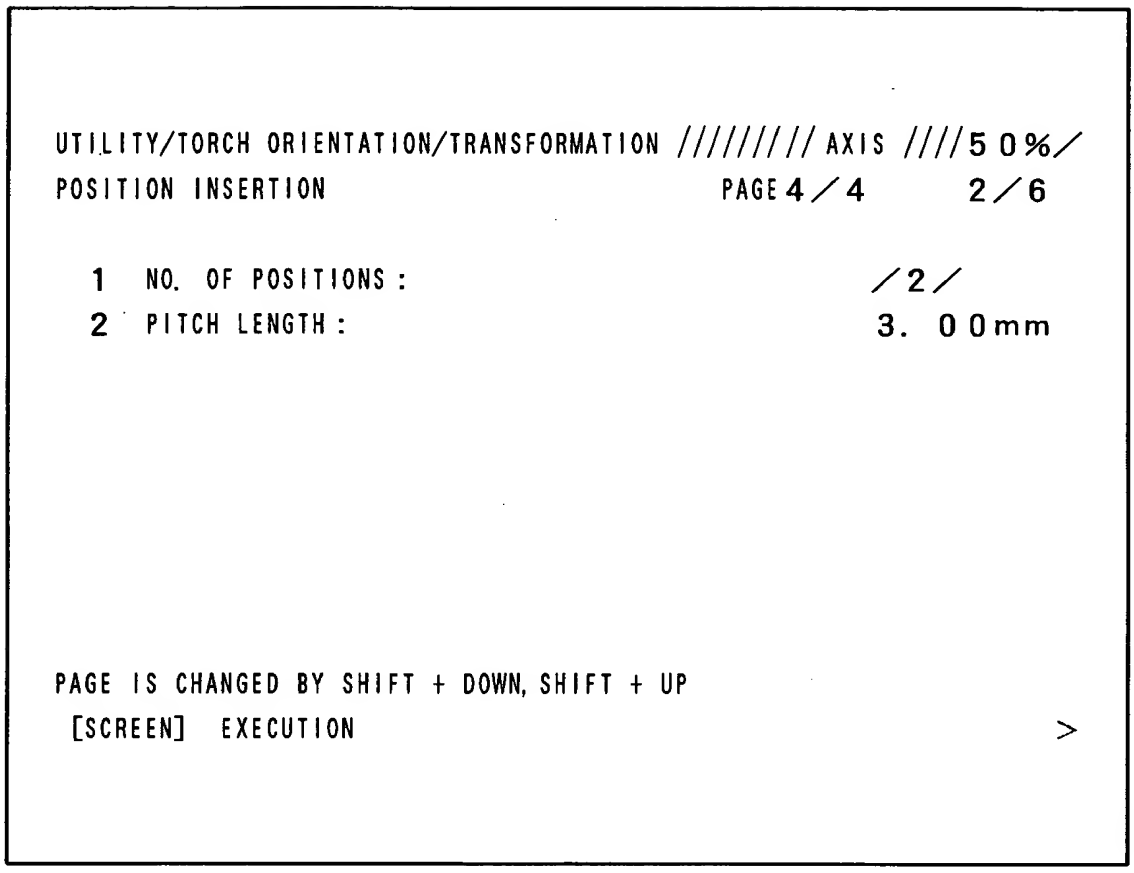

UTILITY/TORCH ORIENTATION/TRANSFORMATION //////// AXIS ////50%/
POSITION INSERTION PAGE 4/4 2/6
1 NO. OF POSITIONS : /2/
2 PITCH LENGTH : 3.00mm
PAGE IS CHANGED BY SHIFT + DOWN, SHIFT + UP
[SCREEN] EXECUTION
>

FIG. 9

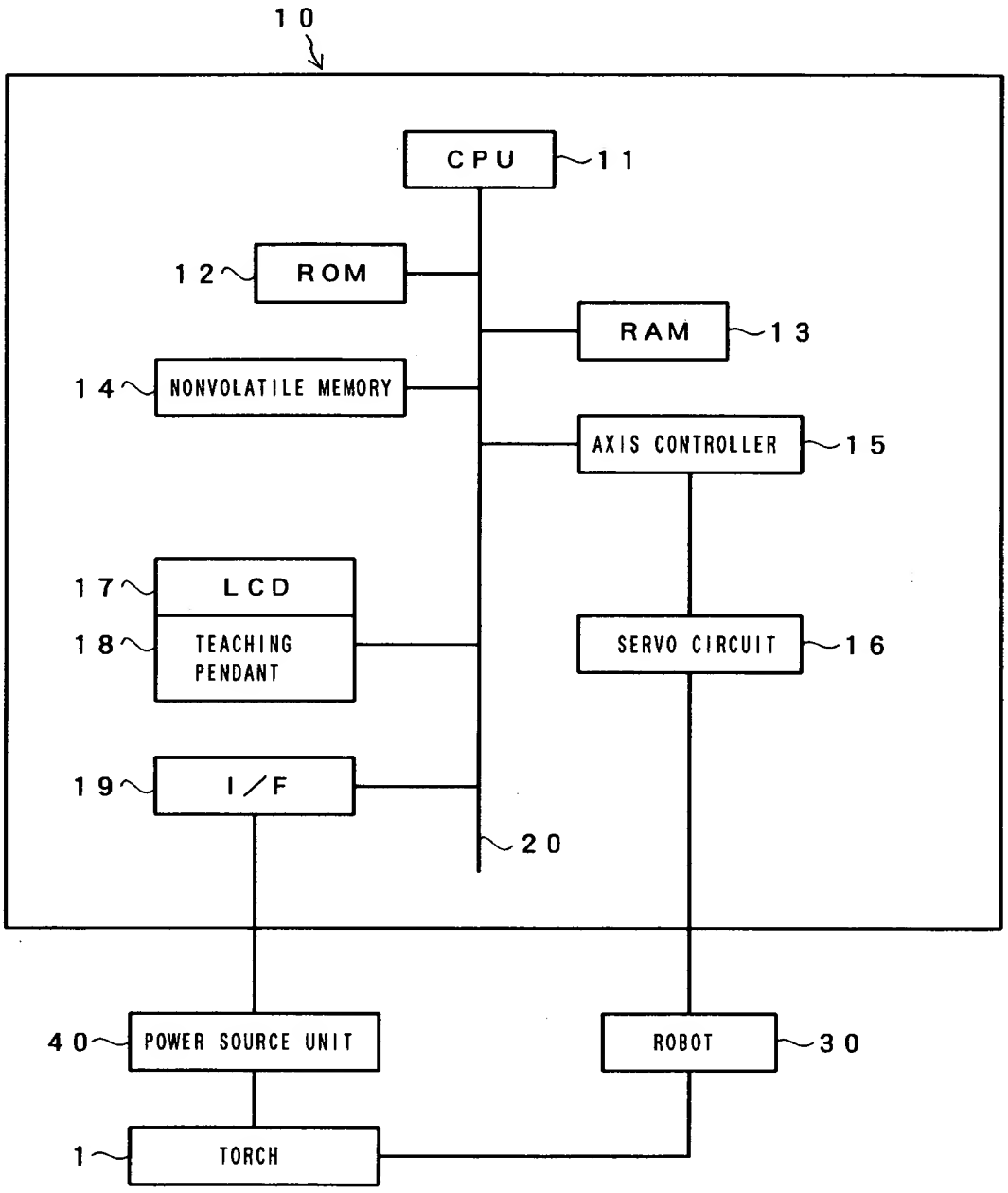

10
CPU
11
12
ROM
RAM
13
14
NONVOLATILE MEMORY
AXIS CONTROLLER
15
17
LCD
18
TEACHING PENDANT
SERVO CIRCUIT
16
19
I/F
20
40
POWER SOURCE UNIT
ROBOT
30
1
TORCH

FIG. 10

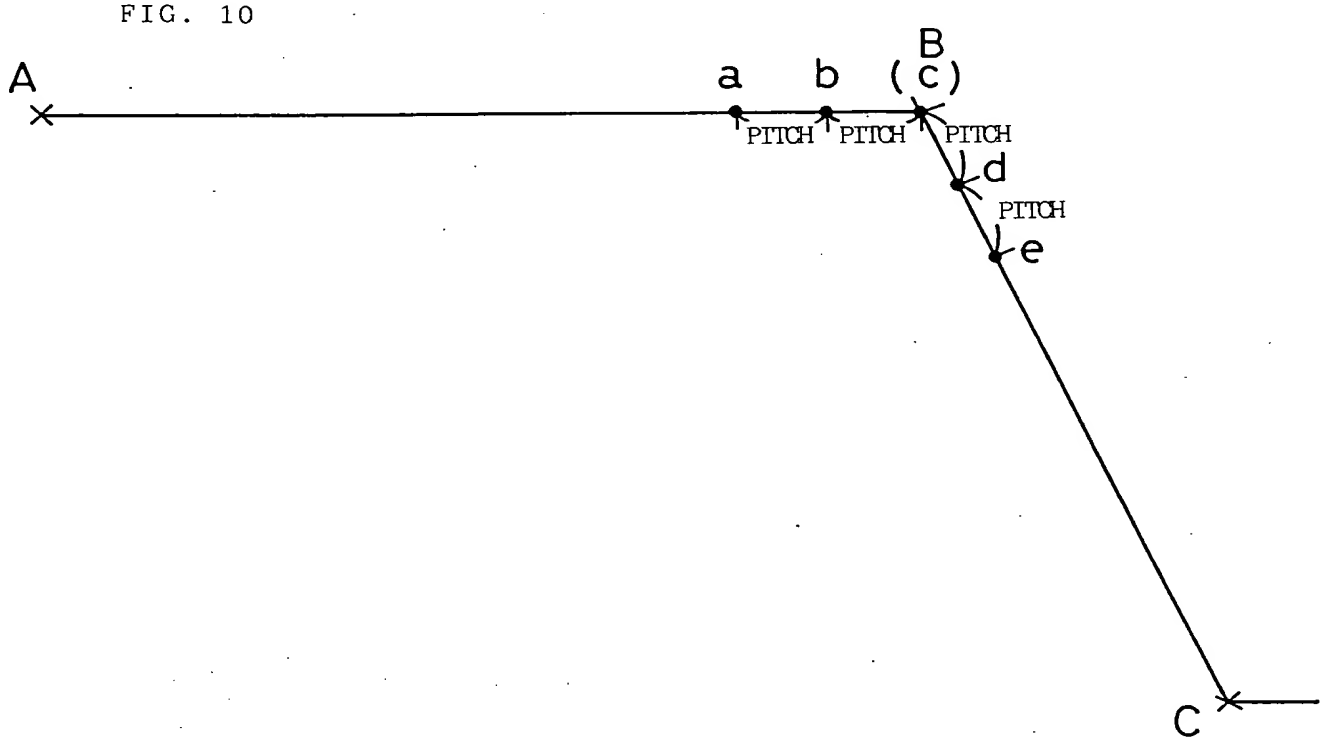


FIG. 11

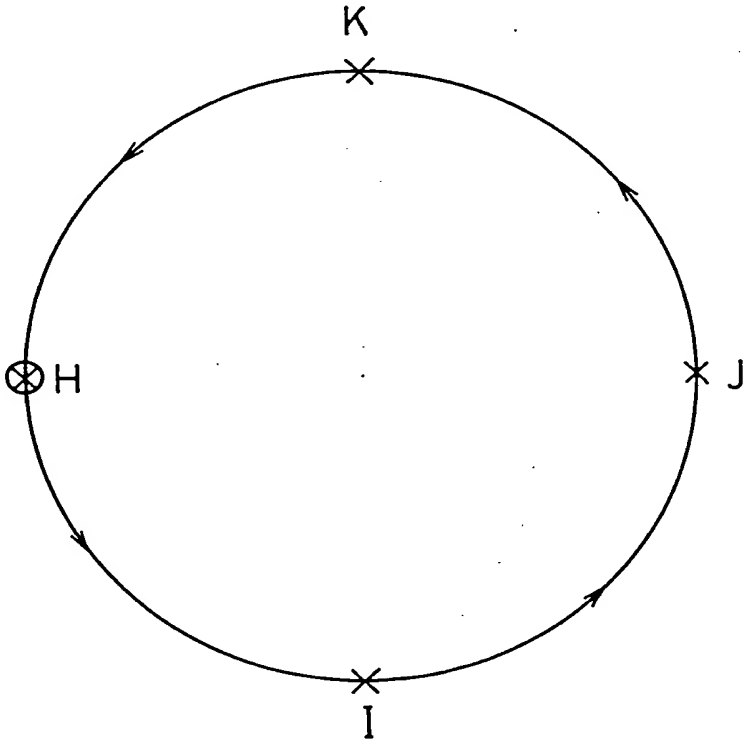
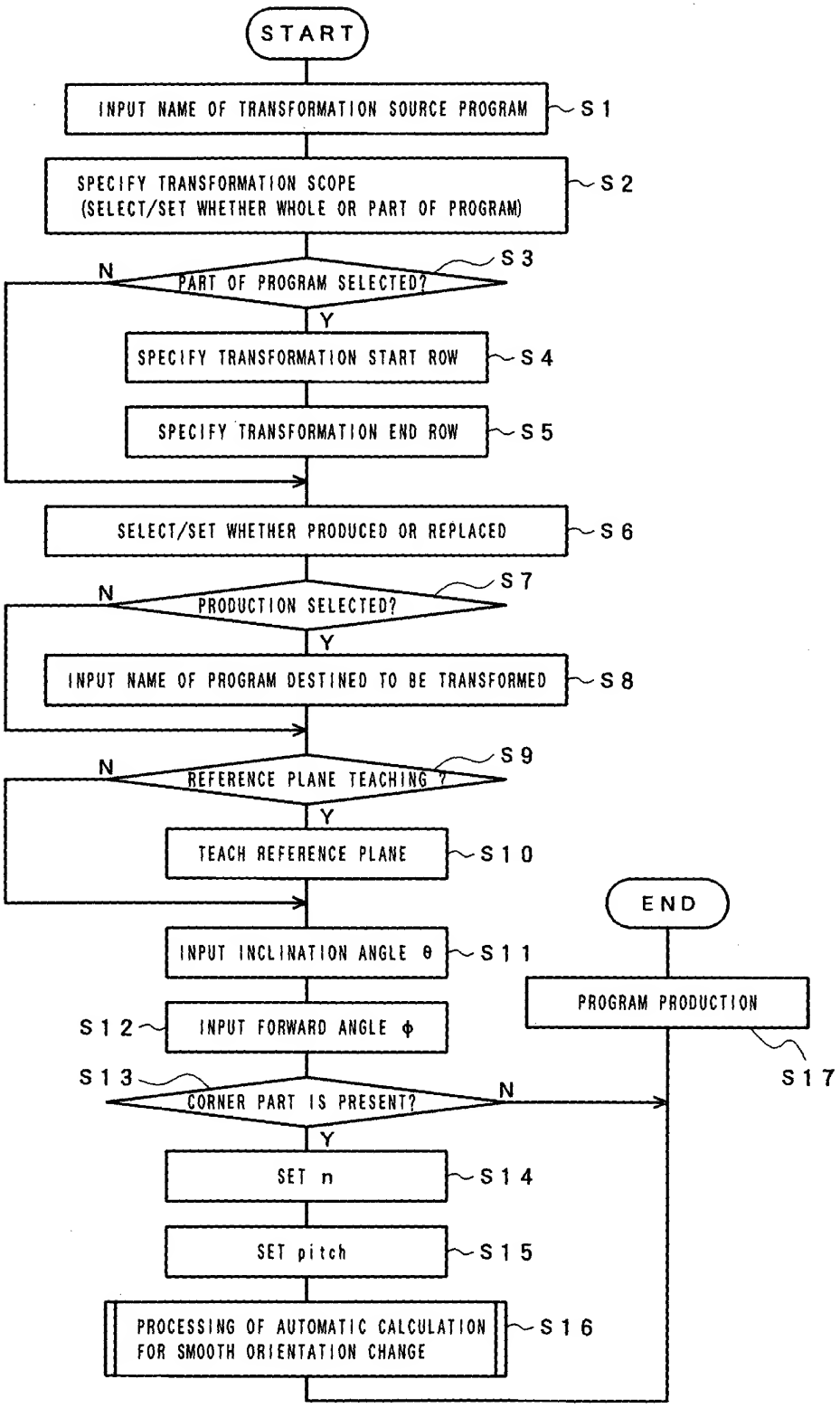


FIG. 12


START
INPUT NAME OF TRANSFORMATION SOURCE PROGRAM
S1
SPECIFY TRANSFORMATION SCOPE
(SELECT/SET WHETHER WHOLE OR PART OF PROGRAM)
S2
PART OF PROGRAM SELECTED?
S3
N
Y
SPECIFY TRANSFORMATION START ROW
S4
SPECIFY TRANSFORMATION END ROW
S5
SELECT/SET WHETHER PRODUCED OR REPLACED
S6
PRODUCTION SELECTED?
S7
N
Y
INPUT NAME OF PROGRAM DESTINED TO BE TRANSFORMED
S8
REFERENCE PLANE TEACHING ?
S9
N
Y
TEACH REFERENCE PLANE
S10
INPUT INCLINATION ANGLE θ
S11
INPUT FORWARD ANGLE φ
S12
CORNER PART IS PRESENT?
S13
N
Y
SET n
S14
SET pitch
S15
PROCESSING OF AUTOMATIC CALCULATION
FOR SMOOTH ORIENTATION CHANGE
S16
END
PROGRAM PRODUCTION
S17